

Amendment
Serial No. 10/644,067
Attorney Docket No. 031034

REMARKS

Claims 8-13 and 15-17 are pending in the application. Claims 8 and 9 are amended herein. Claim 14 is cancelled without prejudice. New claims 15-17 are added herein.

Applicants' Response to Claim Rejections under 35 U.S.C. §103

Claim 8 was rejected under 35 U.S.C. §103(a) as being unpatentable over Suzuki (U.S. Patent No. 6,675,942) (Suzuki '942) in view of Suzuki et al. (U.S. Patent No. 6,170,629) (Suzuki '629) and in further view of Stefanutti et al. (U.S. Patent No. 5,776,288).

The Office Action argues that **Suzuki '942** discloses a friction material substrate with segments joined to the core wherein side portions form straight lines with chamfered portions. The Examiner combines this reference with **Suzuki '629** which discloses that such segments are made by pressing and **Stefanutti** which discloses that the core is made of metal. The Office Action argues that it would have been obvious to combine these references in order to make the present invention.

As admitted by the Examiner, **Suzuki '942** does not disclose or suggest pressing of the edge portions of each of the segment pieces of the friction material substrate by heat-press compression. However, in the present invention, the portion which is heat-compressed is a very compact portion that has a much higher density and a smaller thickness than the other portion of the segment piece. Thus, the structural features of a high density and smaller thickness result from the claimed heat-pressing process. The claimed pressed and compressed portion restrains

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fuzz at a cut end surface of each of the segment pieces and increases strength. Consequently, the invention effectively prevents an increase of a drag torque and generation of layer exfoliation from the cut end surface.

Moreover, it is emphasized that **Suzuki '942** does not show press forming of opposite lateral sides or opposite edge portions of each of the segment pieces. **Suzuki '942** discloses chamfering of opposite lateral end portions 35 into a curved shape. However, it fails to disclose or suggest that such portions be heat-pressed/compressed portions by a press forming such as heat-press compression forming.

Suzuki '629 discloses forming of a concave connecting portion 7 by compression (See Figure 2; Column 3, lines 1-5). However, as indicated in the Office Action, **Suzuki '629** only discloses a method and thus has no influence on the patentability of the device claim of the present invention. Even if **Suzuki '629** were to be applicable, an object of **Suzuki '629** is to prevent exfoliation of a convex portion 3 and a concave portion 4 of the connection portion 6 in case of joining segment pieces 2 closely and with a concave-convex relation (See column 1, lines 37-41). Therefore, the convex portion 3 and the concave portion 4 of the connecting portion 6 have complementary shapes with each other and are closely fitted in each other without any gap or clearance (see Figure 4; column 2, lines 26-40). Moreover, in **Suzuki '629** the entire segment piece 2 of the friction material is stamped from a friction material tape sheet and stuck by pressure on a core metal (see column 2, lines 14-17 and 57-60). Furthermore, the friction material substrate is stuck on the core metal by stamping so that burrs of the convex portion 3

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and the concave portion 4 are disposed at the side of the core metal (see column 2, lines 57-60). Consequently, the burr is generated on the convex portion 3 and the concave portion 4 at the time of sticking the segment piece on the core metal. That is, it implies that the convex portion 3 and the concave portion 4 are not a press/compress portion. Thus, Applicants respectfully submit that claim 8 distinguishes over the cited art. Favorable reconsideration is respectfully requested.

Claims 9-14 were rejected under 35 U.S.C. §103(a) as being unpatentable over Suzuki '942 in view of Kitaori et al. (U.S. Patent No. 6,712,190) and in further view of Stefanutti.

The Office Action argues that **Suzuki '942** discloses a friction material substrate, but does not disclose that the gaps between the segments are greater at the outer edge as compared with the gaps at the inner edge. The Office Action argues that it would have been obvious to combine **Suzuki '942** with **Kitaori** which discloses such gaps. The Office Action relies on **Stefanutti** to teach a metal core.

The outlets 4d are greater in width than the inlets 4c in **Kitaori**. However, the shape of friction elements 4a are an almost trapezoidal shape. This allows for an oil passage 4b shaped such that it increases in width from the inner to the outer openings.

However, the embodiments of Figures 16 and 17 of the invention show segment pieces 103 and 107 and oil grooves 104 and 108 which are different than the structure of **Kitaori**. Each of the embodiments of Figures 16 and 17 have a reversed trapezoidal shape or a sector shape that

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has a top side wider than a bottom side. In contrast, the segment piece of **Kitaori** has a normal trapezoidal shape having a top side narrower than a bottom side. Therefore, the oil grooves 104 and 108 have the same width at all parts, with the exception of their longitudinal opposite ends or inner and outer peripheral sides of the segment pieces 103 and 107. At these locations, the oil grooves have a curved shape (Figure 16) or a chamfered shape (Figure 17) in plan view at the longitudinal opposite ends. With such a structure, the outer peripheral opening has a width longer than a width of the inner peripheral opening.

The present application discloses friction material segments of the same overall shape as **Suzuki '942**, but with a different pressed area. The present application discloses that the pressed portions of the segment are not consistent in width. The opposite parts 6 are pressed while the center of the segment remains unpressed. The two lines which define the pressed and unpressed regions are parallel to each other as a result of the method in which they were pressed. See Figures 2-4. In order to recite this structure, Applicants submit new claim 15 to specifically recite this structure. Furthermore, Applicants also submit new claim 16 which recites pressing on all four sides as a new independent claim for greater simplicity and clarity.

Amended claim 9 does not claim the embodiment of Figure 18. As such, Applicants submit new claim 17 to cover this embodiment. **Kitaori** discloses an outlet 4d of an oil groove between segment pieces 4a that is wider than an inlet 4c. See Figure 3 of **Kitaori**. This appears to be similar to the embodiment of Figure 18 of the present application.

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However, segment piece 112 of Figure 18 has a rectangular shape, including a square shape, while the segment piece 4a of Kitaori has a normal trapezoidal shape. This difference in shape improves material yield, restrains layer exfoliation and reduces costs.

The segment piece of **Kitaori** has a surface area as a friction material smaller than that of the segment piece of Figure 18 of the invention, thereby having an inferior drive transmission force. In order to compensate for such a disadvantage, a high pressure must be applied on the friction material of **Kitaori**. Therefore, heat-resistance and durability of the friction material is lowered.

On the other hand, the present invention aims to restrain an oil pressure generated at an outer peripheral portion of the segment pieces by enlarging a width of the outer peripheral opening of the oil groove, thereby preventing peeling off of the segment pieces. Simply enlarging the size of the segment pieces is not enough. The shape of Figure 18 having a center axis and lateral opposite sides that are parallel or substantially parallel to each other is optimal in order to assure a transmission force.

For at least the foregoing reasons, the claimed invention distinguishes over the cited art and defines patentable subject matter. Favorable reconsideration is earnestly solicited.

Should the Examiner deem that any further action by applicants would be desirable to place the application in condition for allowance, the Examiner is encouraged to telephone applicants' undersigned agent.

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If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

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